

## Claims

We claim:

1. A process for integrating a blast furnace and an air separation unit comprising the steps of:
  - feeding feed air to the blast furnace;
  - removing a first portion of feed air to the blast furnace;
  - separating at least one oxygen rich stream and at least a second stream from the first portion in the air separation unit;
  - heating the second stream;
  - expanding the second stream to recover energy; and,
  - feeding at least a portion of the oxygen rich stream to the blast furnace.
2. The process of Claim 1 wherein the oxygen rich stream is mixed with feed air prior to being fed to the blast furnace.
3. The process of Claim 1 wherein at least a portion of the energy recovered is utilized to drive at least one compressor associated with the air separation unit.
4. The process of Claim 1 further comprising the step of removing a low BTU off gas from the blast furnace.
5. The process of Claim 1 wherein the second stream is heated by indirect heat exchange.
6. The process of Claim 1 wherein the second stream is heated by a combustion product from a combustion chamber.
7. The process of Claim 4 wherein the second gas is heated by a combustion product of the off gas from a combustion chamber.

8. The process of Claim 1 wherein the air separation unit further comprises at least one distillation column producing an oxygen rich stream having an oxygen content greater than 21.0% by volume.
9. The process of Claim 1 wherein the second stream is a nitrogen rich gas.
10. The process of Claim 1 wherein the feed air is at a pressure between about three (3) bar to about ten (10) bar.
11. The process of Claim 1 further comprising linking the expansion of the second gas to at least one compressor associated with the air separation unit.
12. The process of Claim 1 further comprising mixing additional air with the first portion.
13. A system for recovering a portion of energy associated with an air separation unit for supplying oxygen rich gas to feed air of a blast furnace comprising:  
an air separation unit fed at least partially with a first portion of a feed air to a blast furnace from which an oxygen rich product is removed from the air separation unit and mixed with a remaining portion of the blast furnace feed air and fed to the blast furnace; removing a second gas from the air separation unit and heating the second gas; and, expanding the second gas to recover energy.
14. The system of Claim 13 wherein the second gas is heated by heat exchange with a combustion product.
15. The system of Claim 13 wherein the second gas is mixed with a combustion product.
16. The system of Claim 13 wherein an off gas of the blast furnace is a fuel for a combustion chamber to heat the second gas.
17. The system of Claim 13 further comprising mixing additional air with the first portion.